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Shadwell et al.

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(54) **UNIVERSAL FASTENER FOR DECKING**

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(Continued)

(52) **U.S. Cl.**

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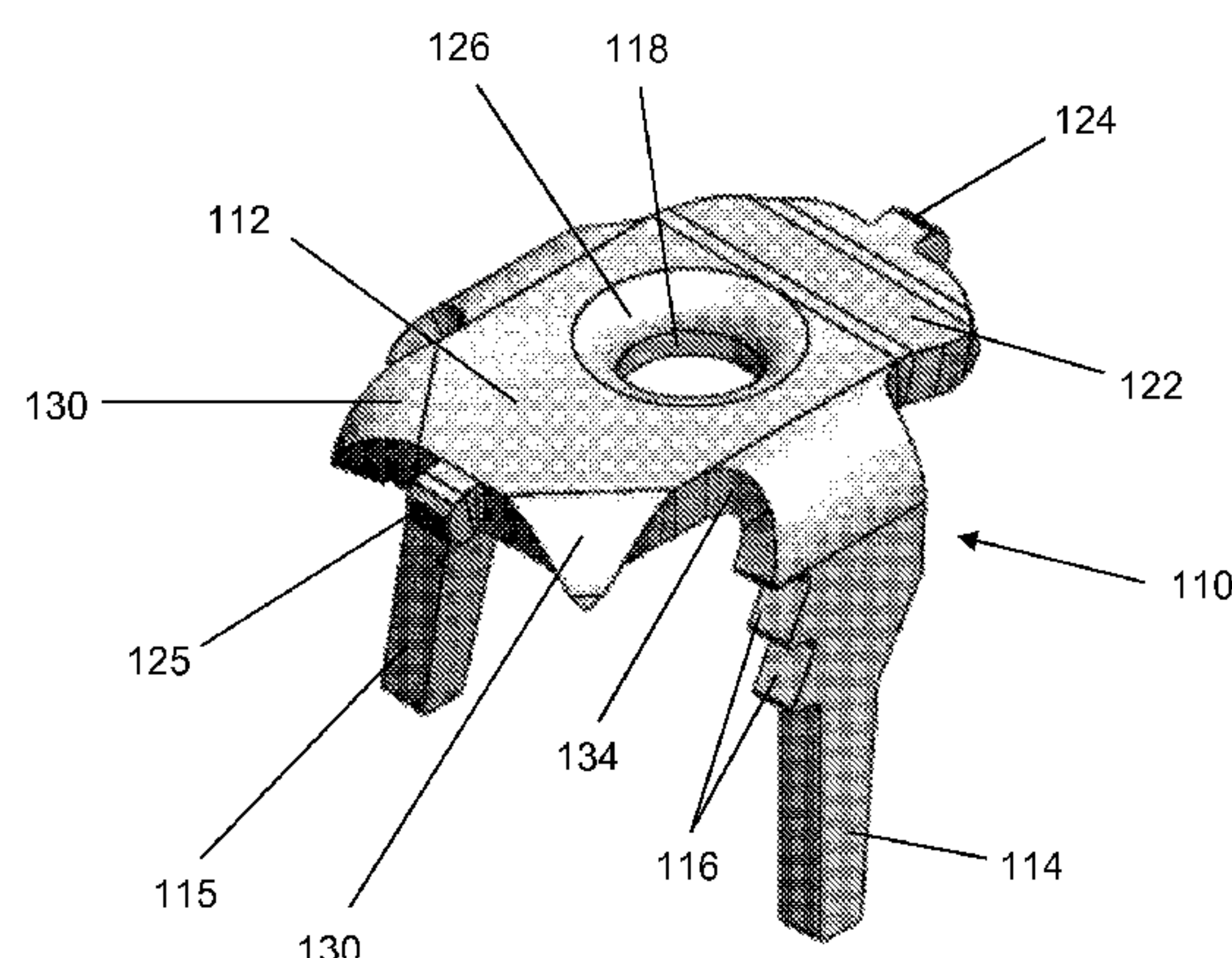
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(57)

ABSTRACT

A fastener for attaching grooved decking planks to a support member has a body defining an attachment opening spacing apart opposing legs extending from a shoulder. The legs have at least one frontward extending prong. The rear end of the body includes a bend transitioning to a lip. The front end may have downward extending teeth. A nose may extend from the front end while a tail may extend from the rear end of the body. Adjacent fasteners may be joined by their respective noses and tails to form a collated series of fasteners.

21 Claims, 10 Drawing Sheets



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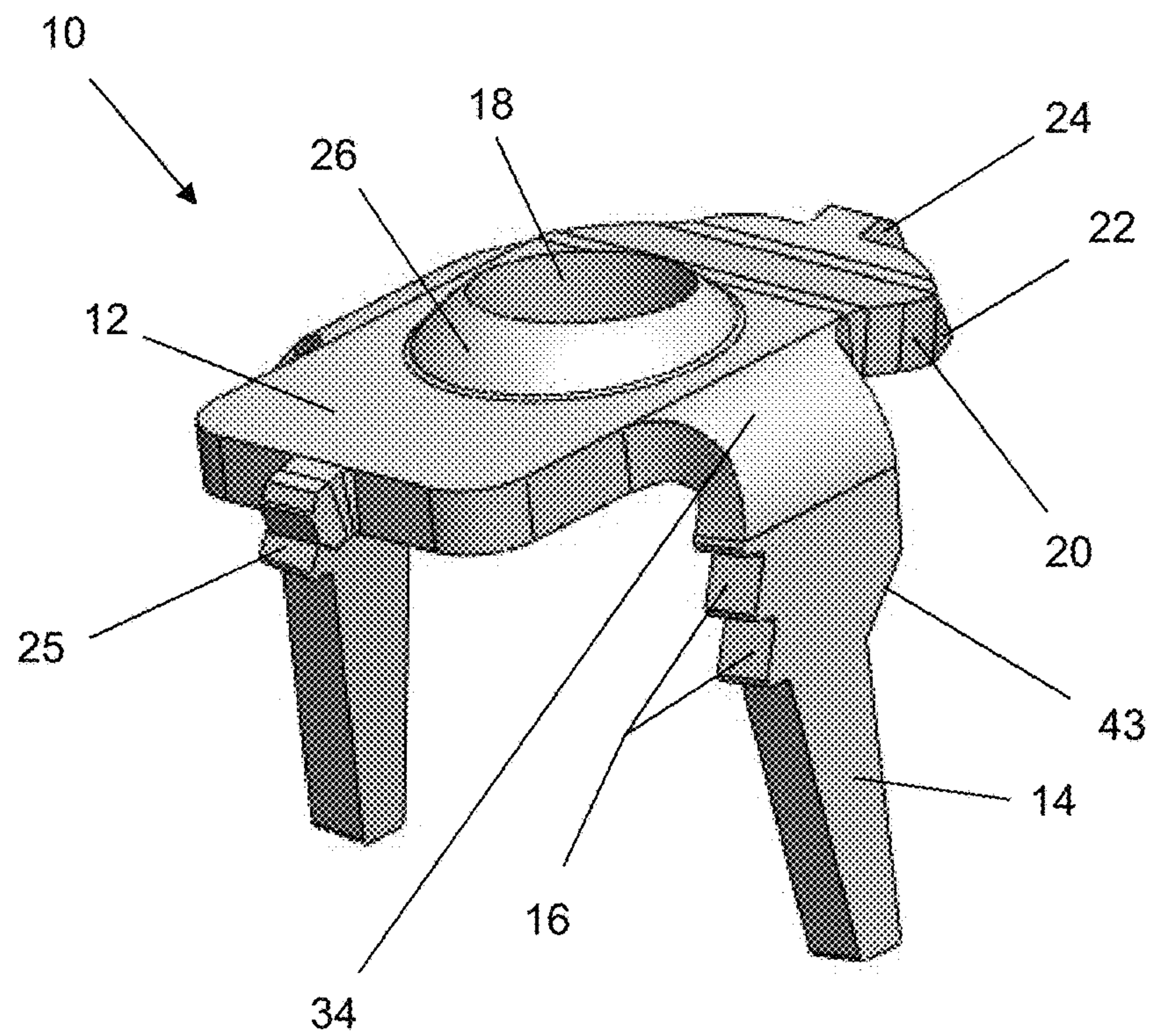


Figure 1

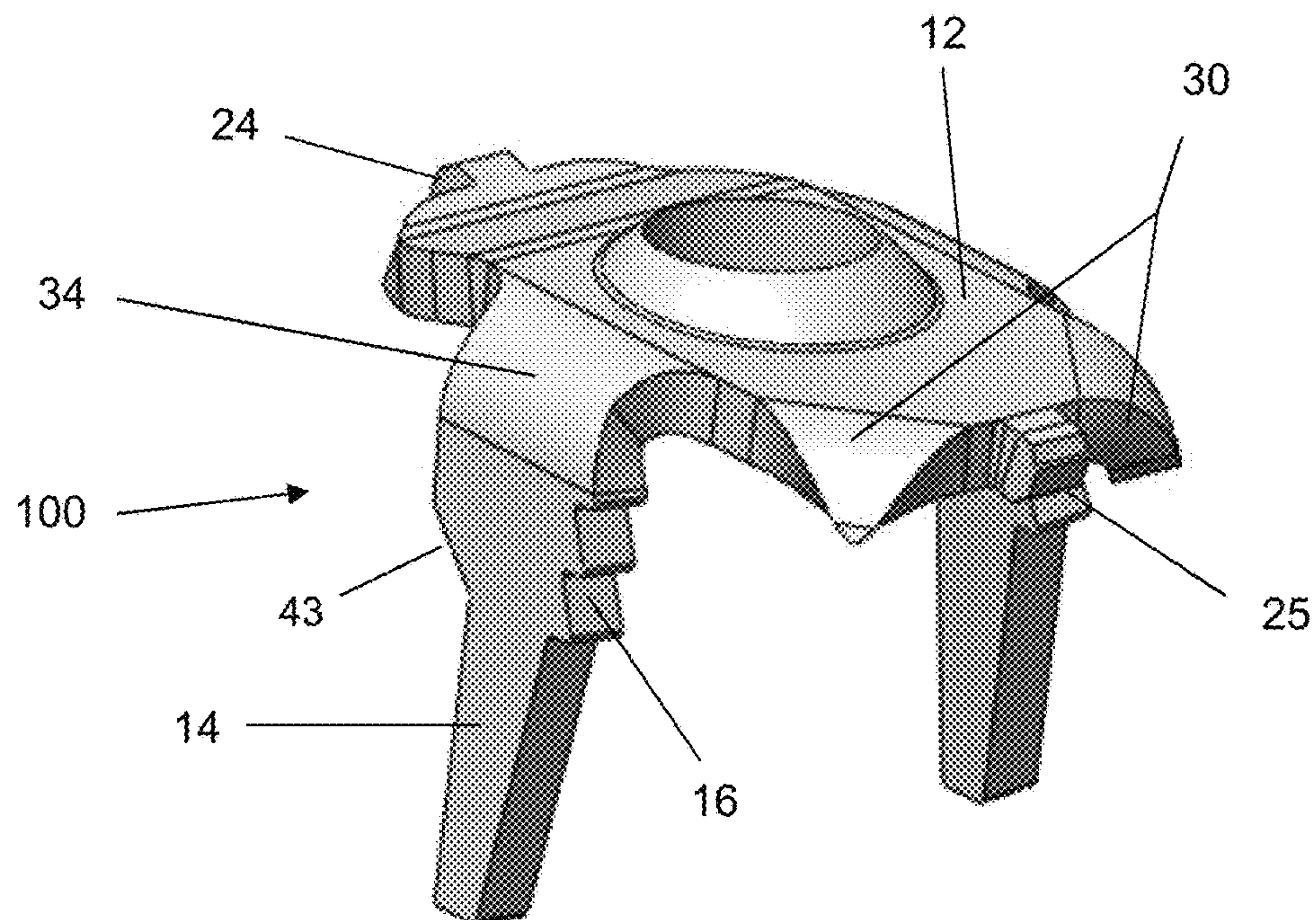


Figure 2

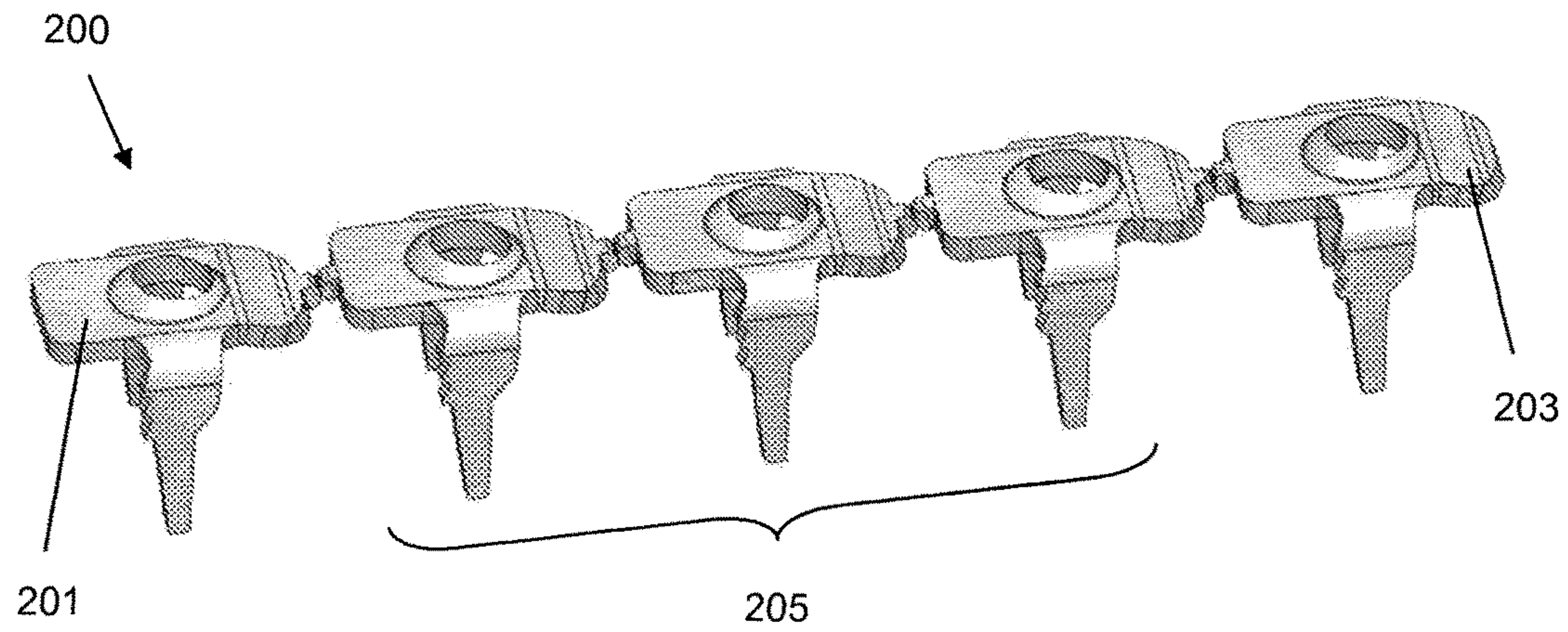


Figure 3

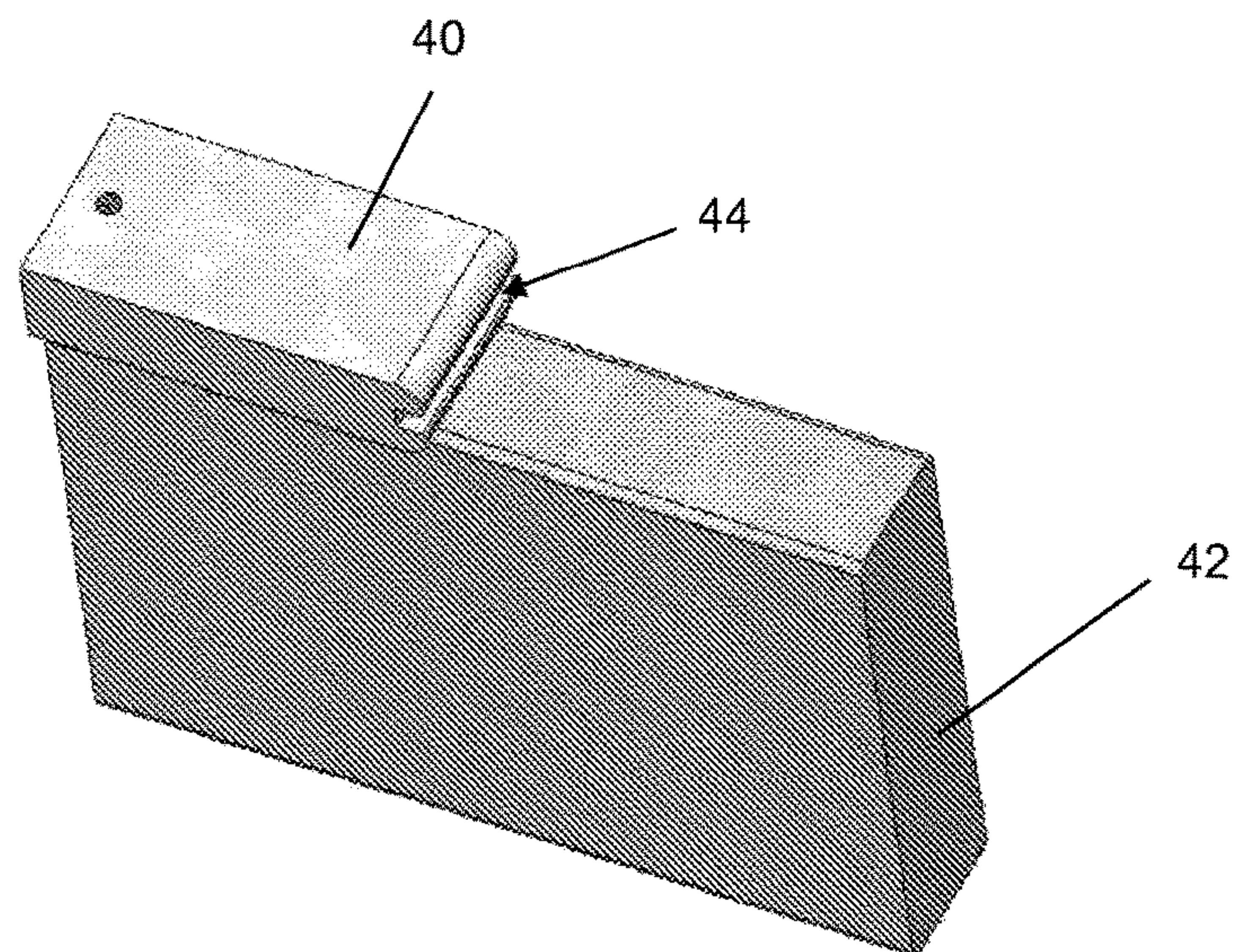


Figure 4

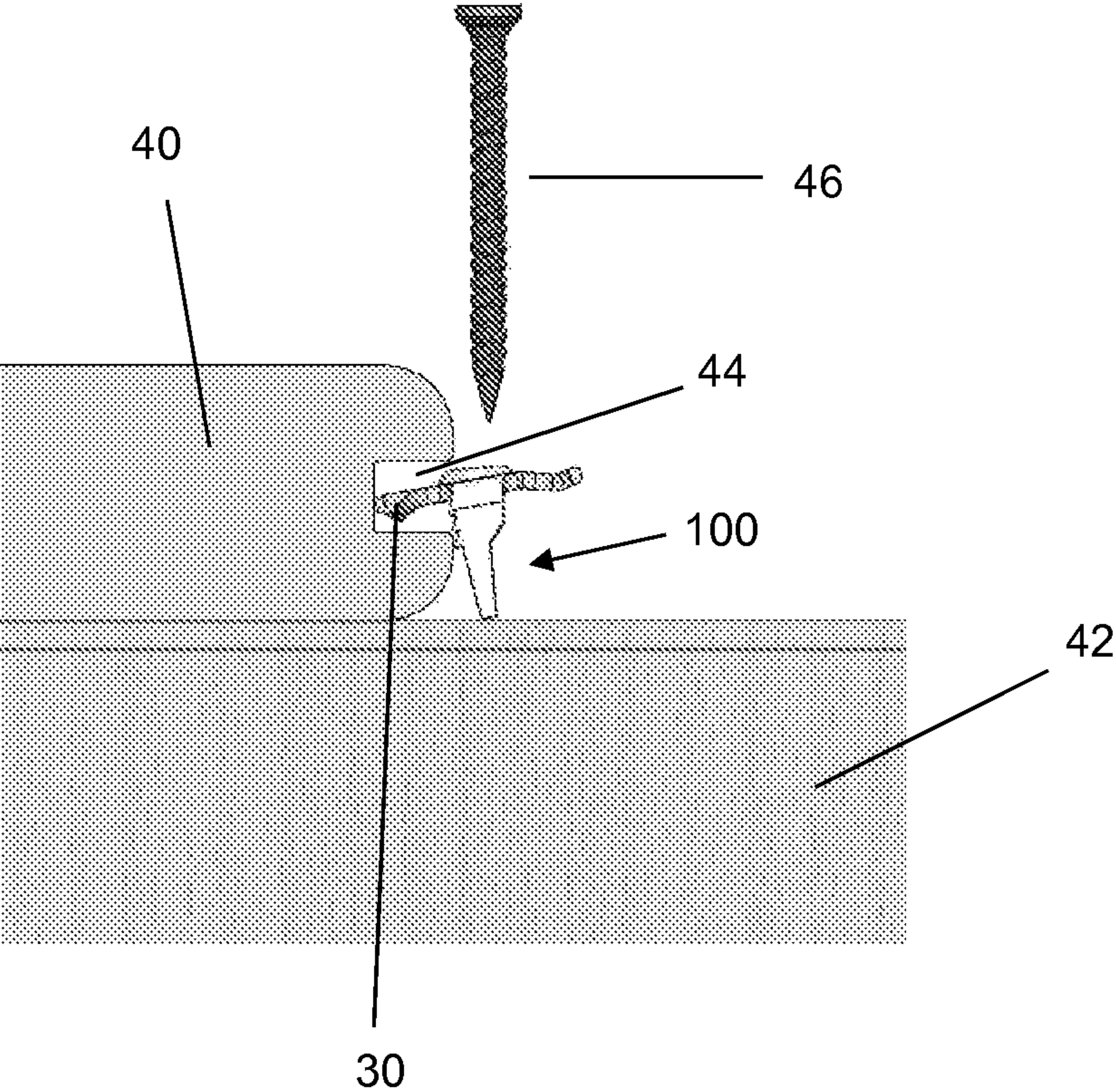


Figure 5

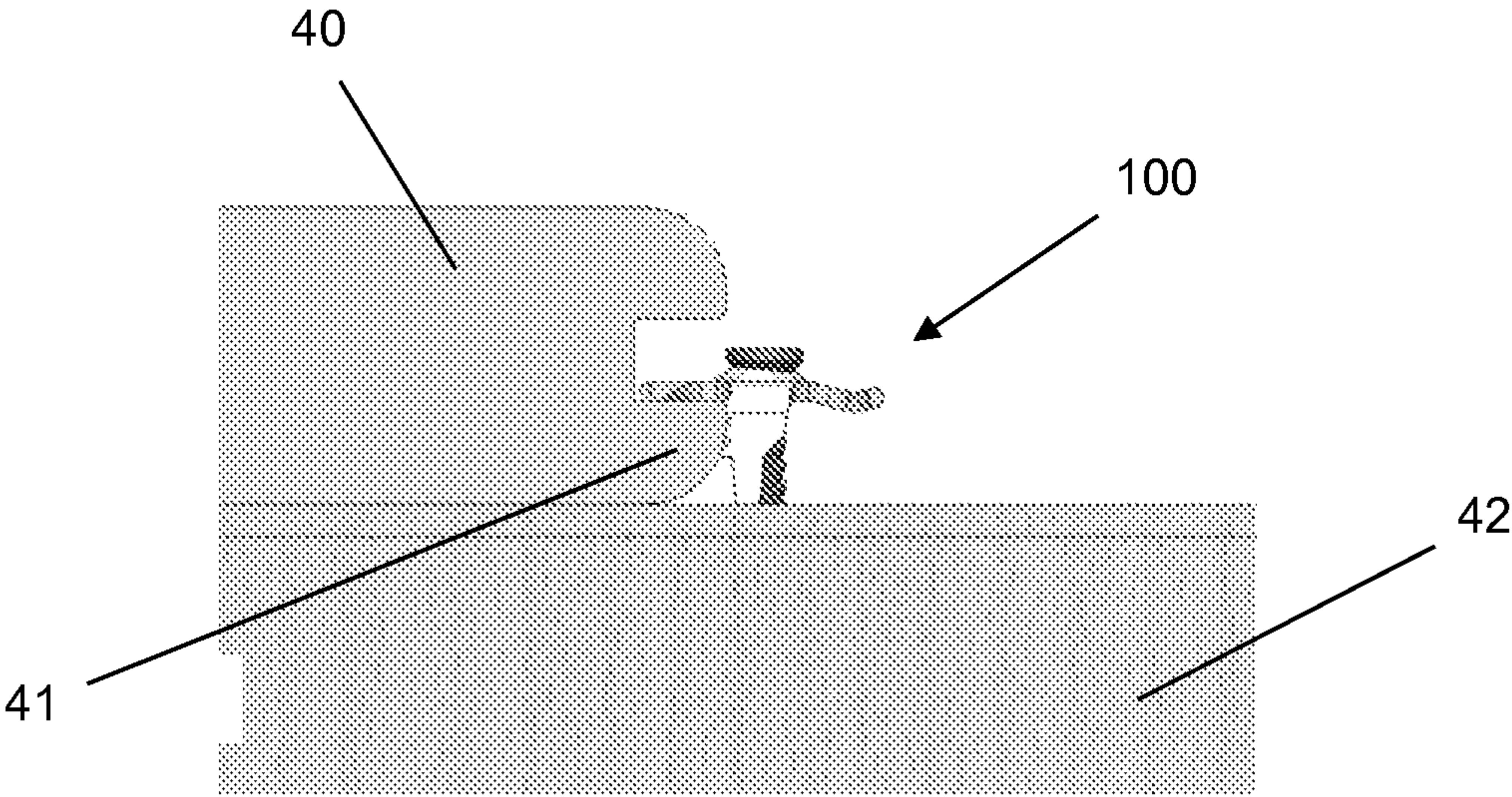


Figure 6

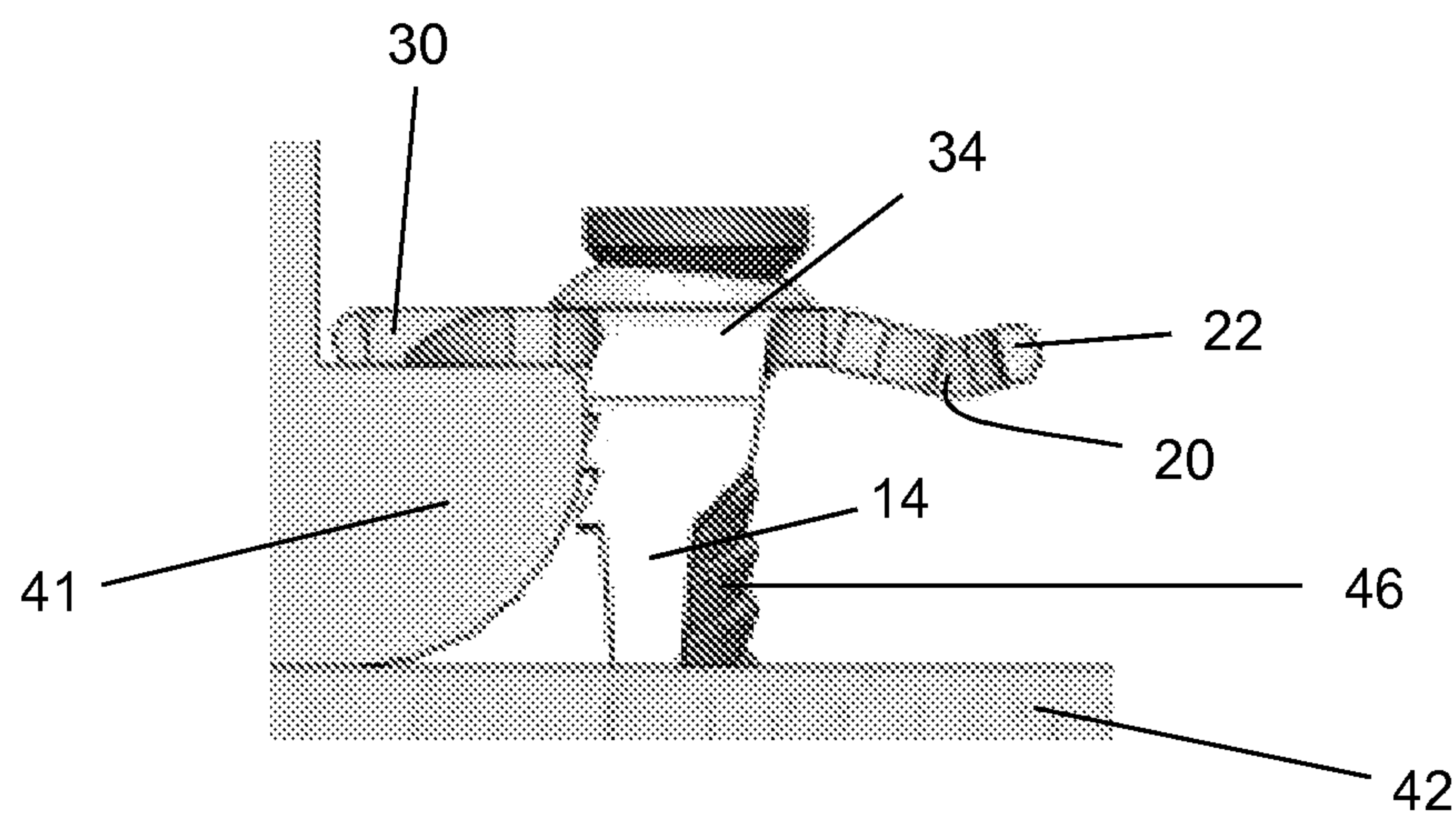


Figure 7

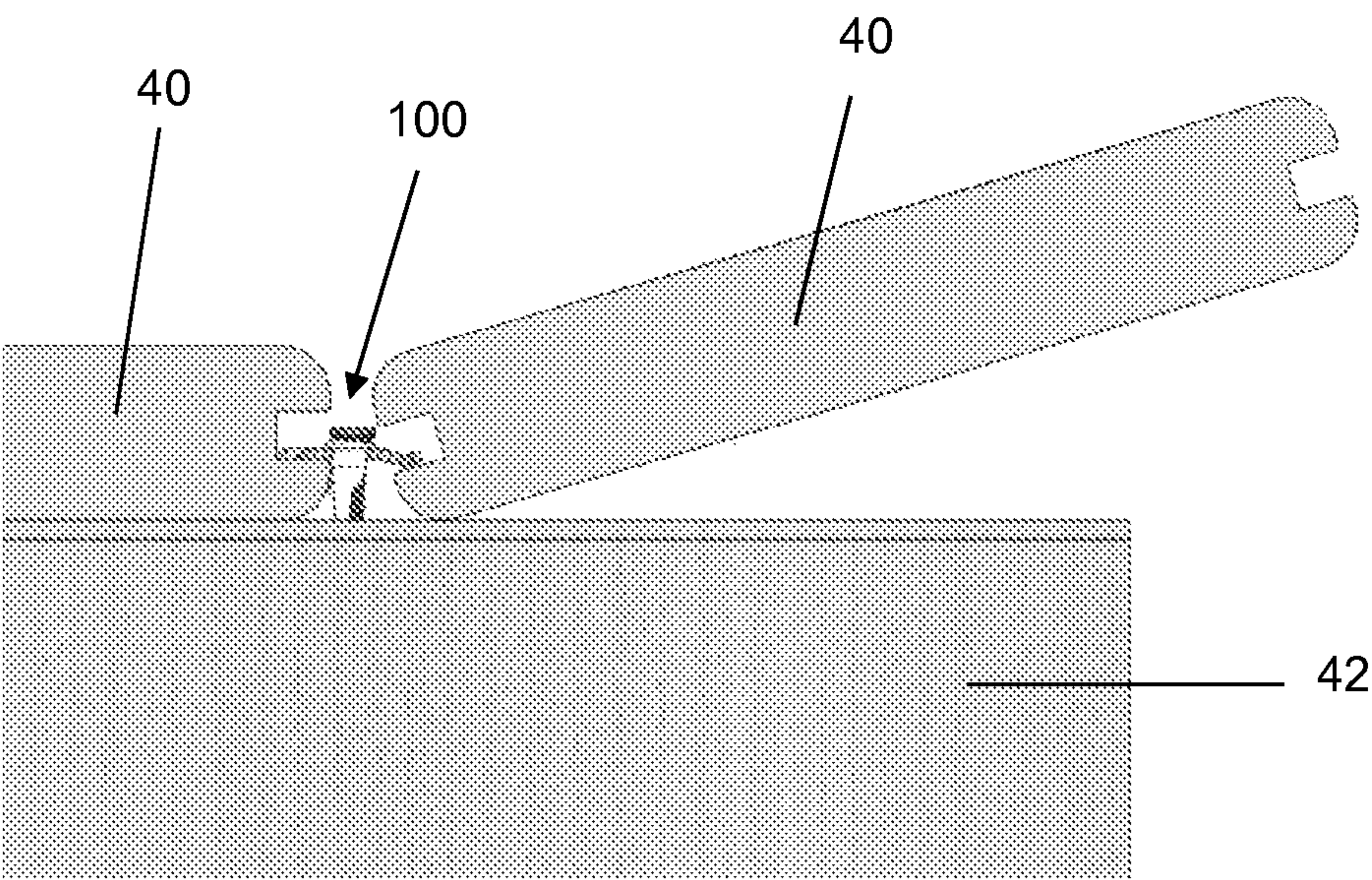


Figure 8

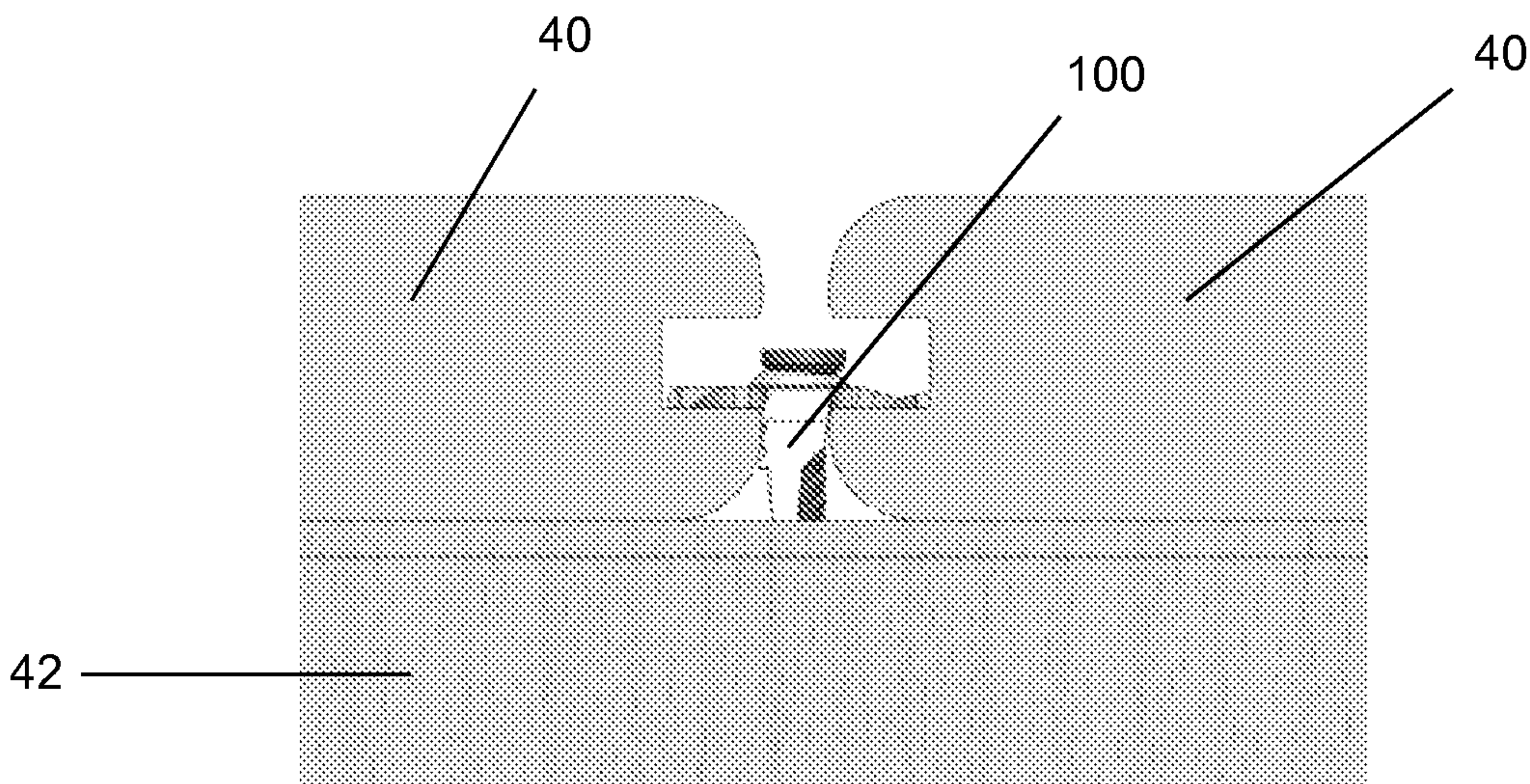


Figure 9

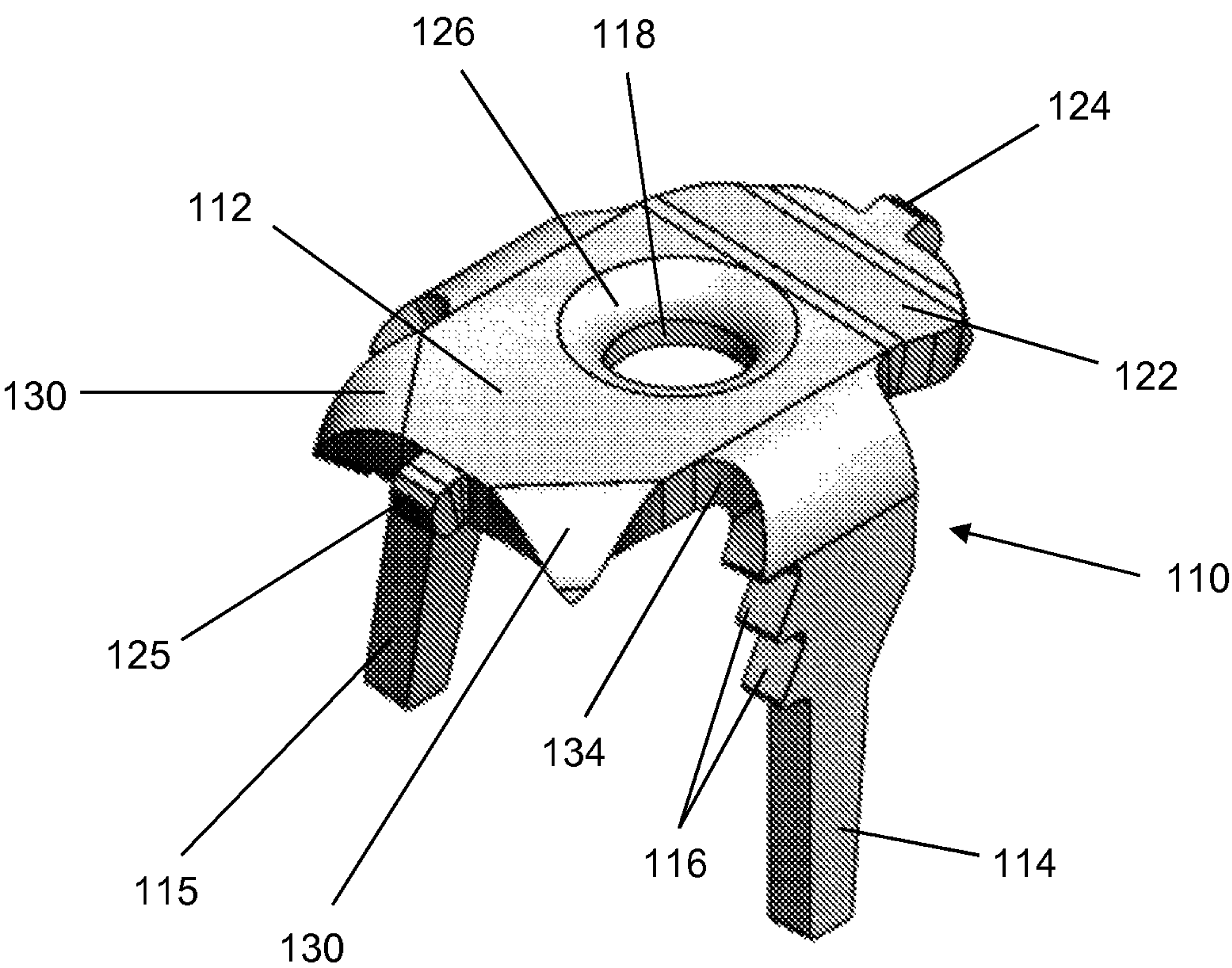


Figure 10

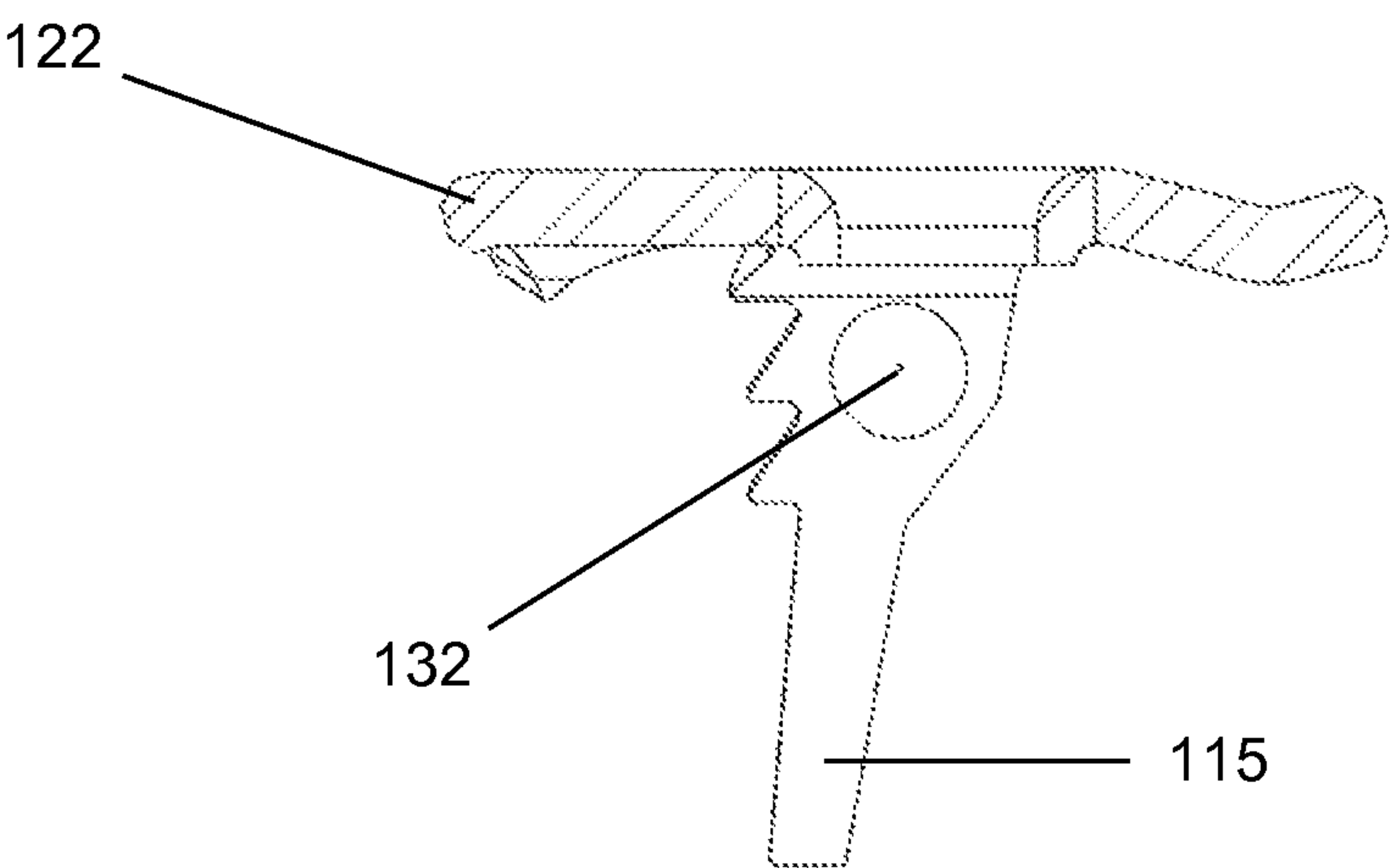


Figure 11

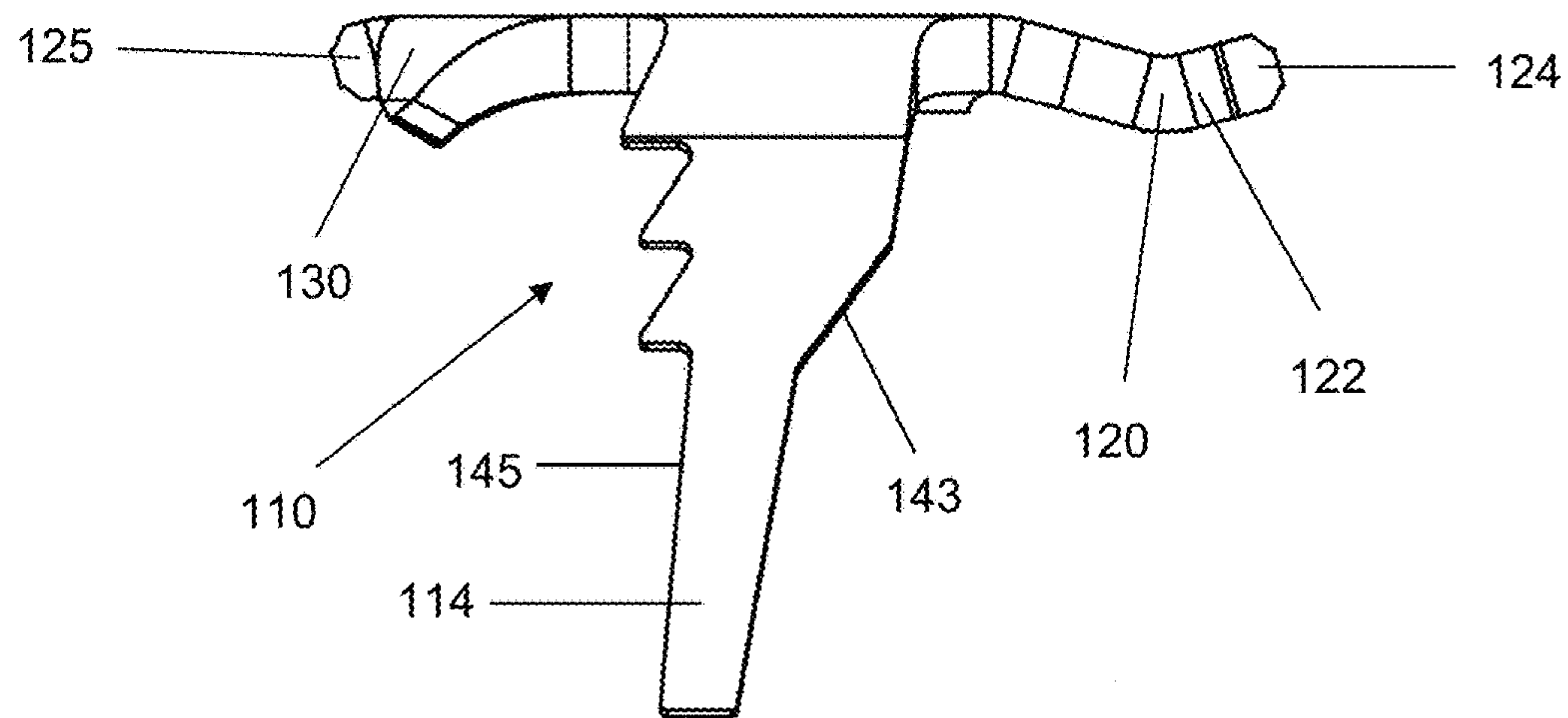


Figure 12

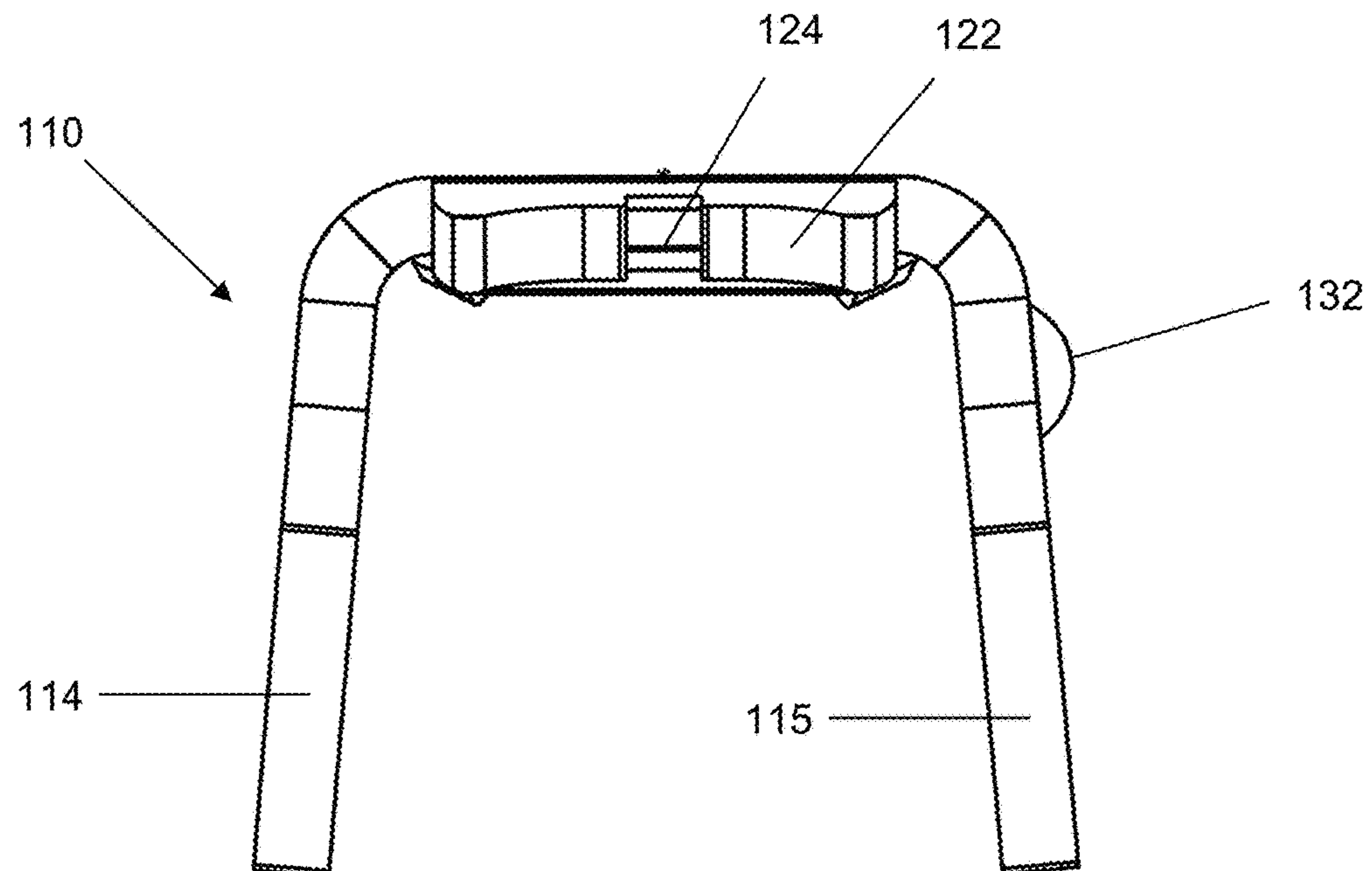


Figure 13

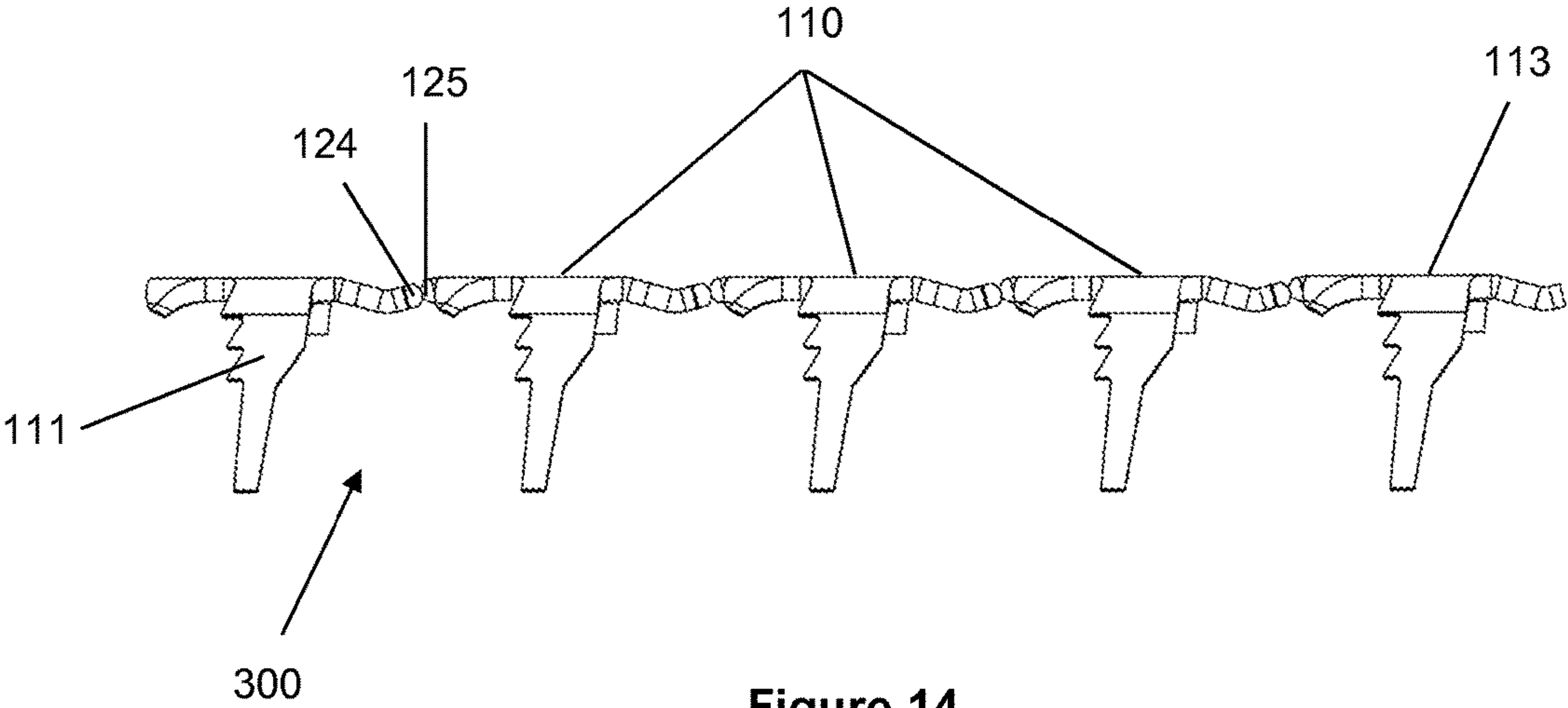


Figure 14

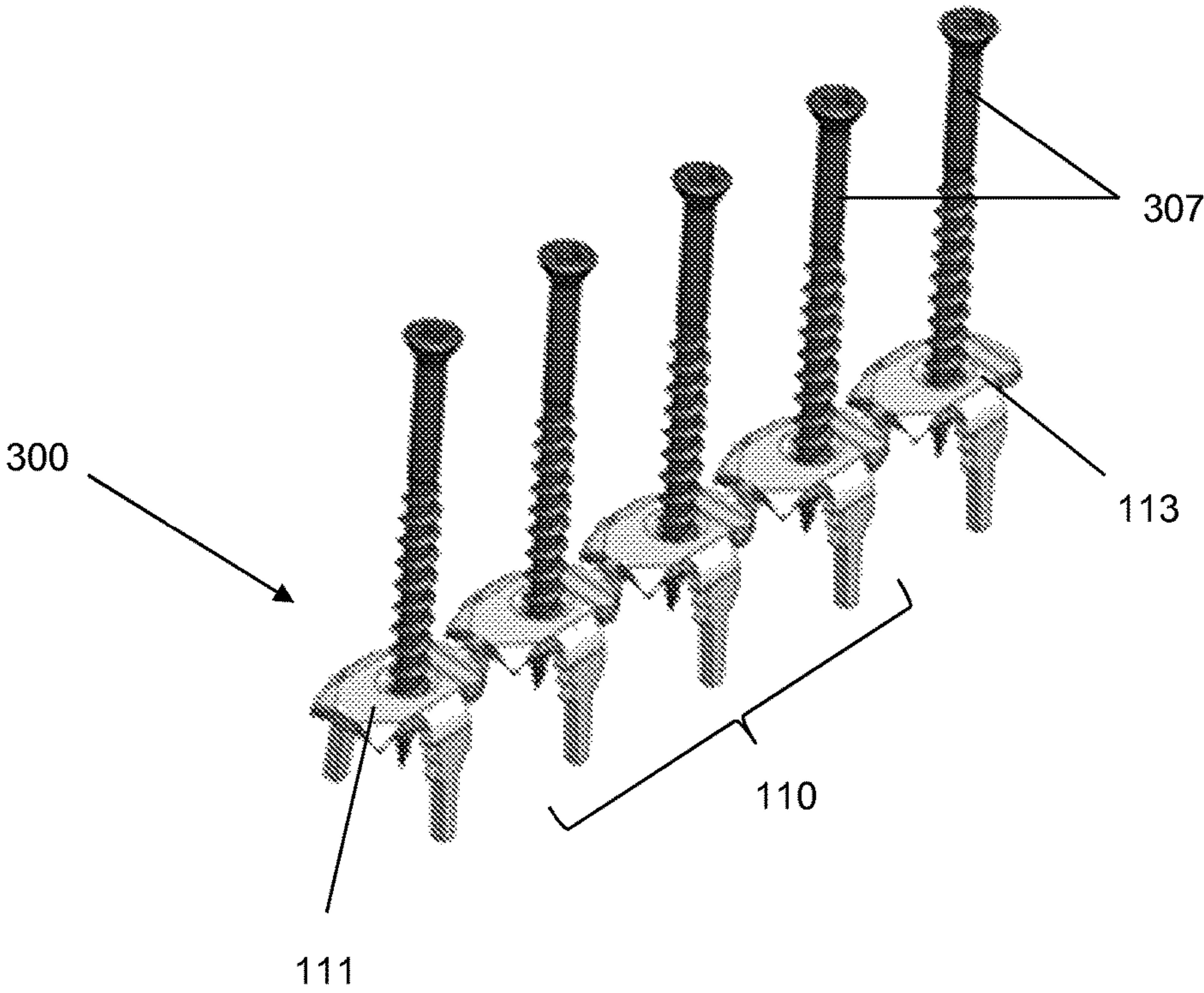


Figure 15

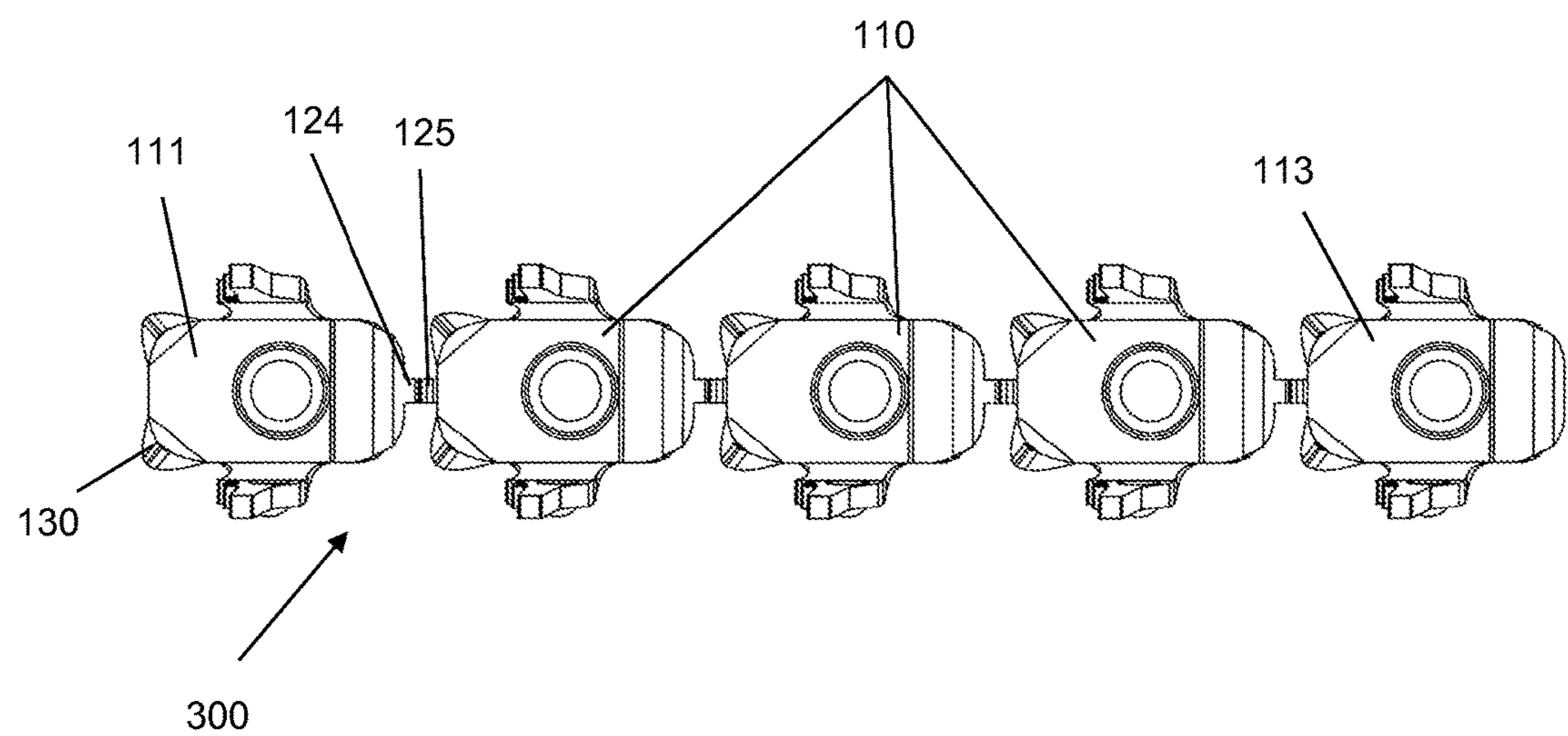


Figure 16

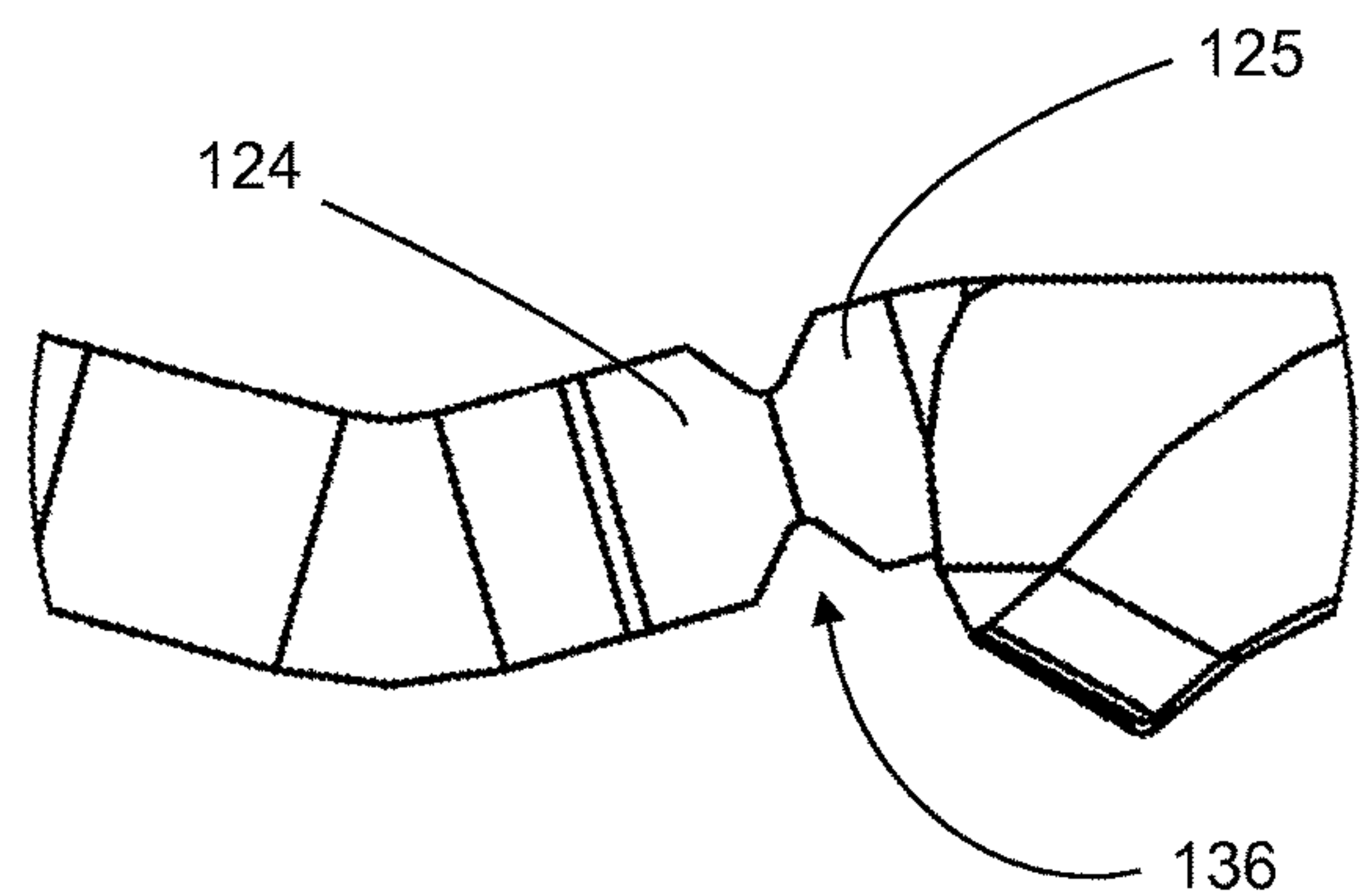


Figure 17

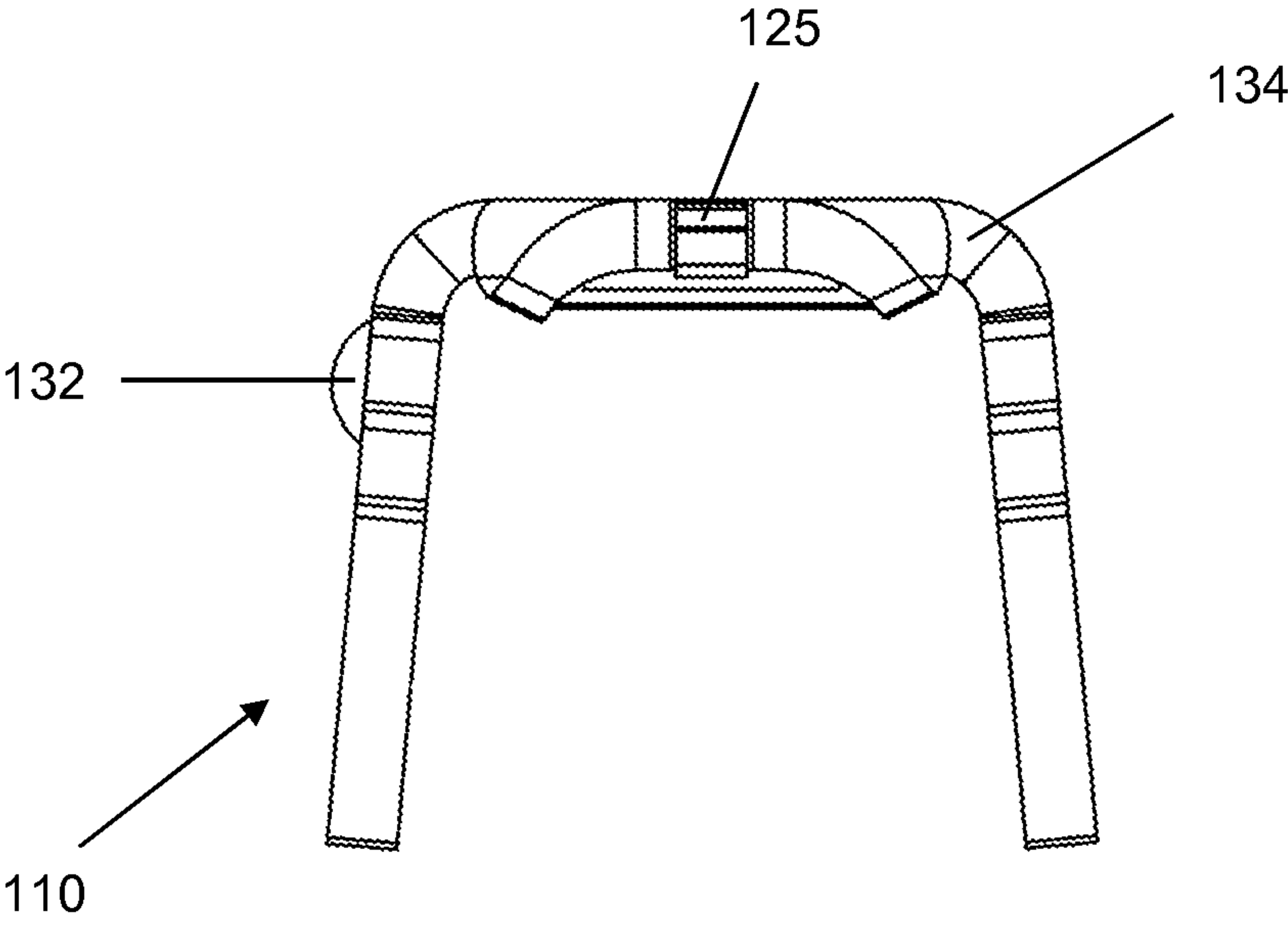


Figure 18A

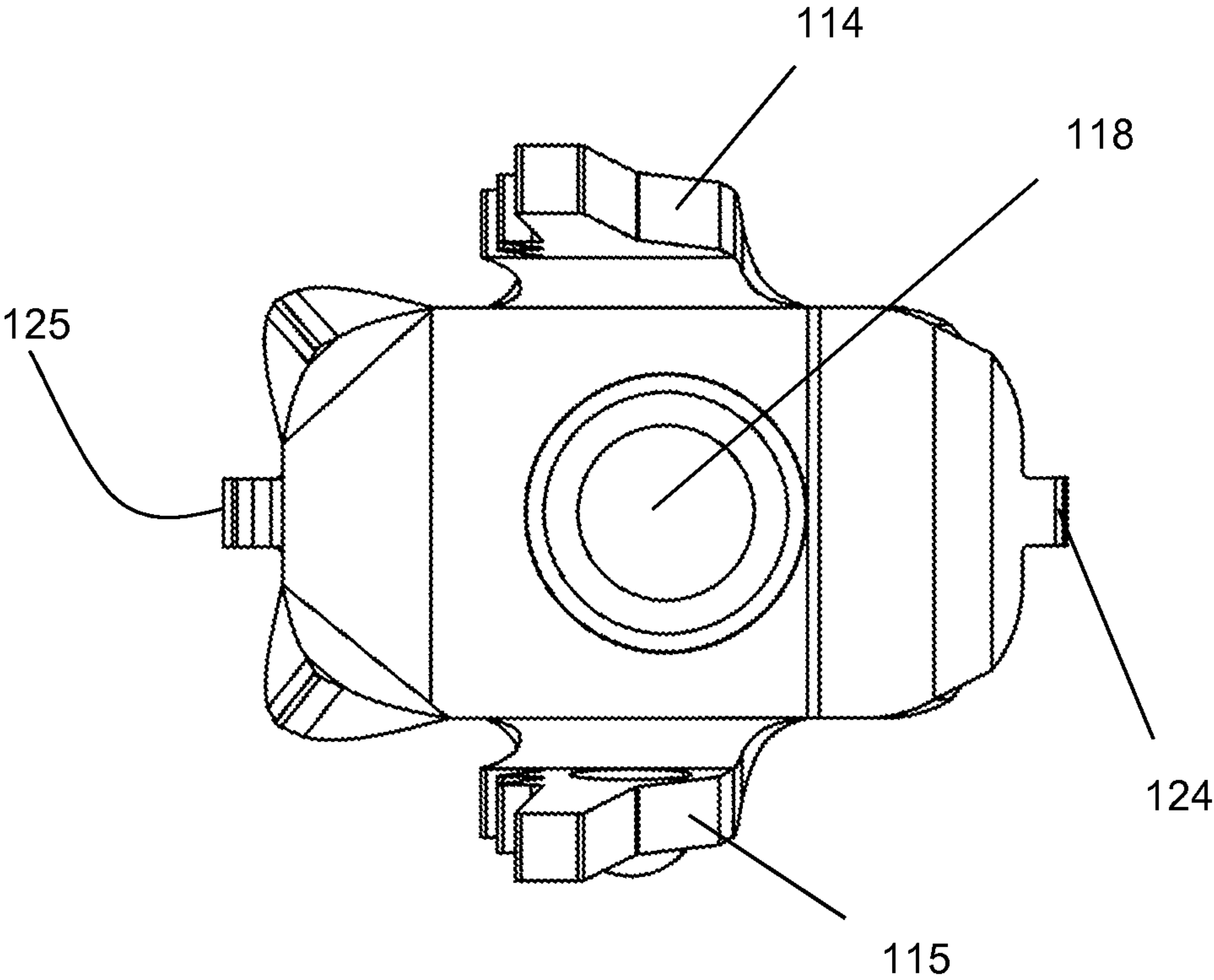


Figure 18B

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UNIVERSAL FASTENER FOR DECKING

CROSS-REFERENCE TO RELATED
APPLICATIONS

This application claims priority to U.S. Provisional Application Nos. 61/711,243, filed Oct. 9, 2012, and 61/779,071, filed Mar. 13, 2013, the contents of which are hereby incorporated by reference in their entireties

BACKGROUND

The invention relates to deck plank fasteners or clips for securing a deck plank to a joist and for supporting deck planks relative to one another. More particularly, the invention relates to a hidden deck plank fastener for use with deck planks having undercut side grooves which vary widely in terms of dimensions and material properties.

Hidden deck plank fasteners for planks with undercut side groove exist, and are typically specific to a type of plank, groove dimension, nub dimension, material, amongst other variables. It would be useful to have a fastener that is compatible with planks having different styles, groove types and dimensions, and materials.

SUMMARY

An embodiment of the fastener has a body extending from a front end to a rear end. The body has a generally flat portion defining a plane extending between two opposing edges. An attachment opening extends from a top surface to a bottom surface of the body. A first bellow extends from one edge of the body and transitions to a downwardly projecting first leg. An opposite second bellow extends from the opposite edge to a downwardly projecting second leg. Each leg has at least one prong projecting from a front edge thereof.

Another embodiment includes a series of fasteners. A first fastener has a body extending from a front end to a rear end. The body has a generally flat portion defining a first plane that extends between two opposing edges. The rear end has a tail projected rearward therefrom. The body defines an attachment opening extending from a top surface to a bottom surface thereof. A first leg extends obliquely from one edge of the body while an opposite second leg extends obliquely from the other edge of the body and includes an alignment member. A second fastener has a body extending from a front end to a rear end. The body has a generally flat portion defining a first plane that extends between two opposing edges. The front end has a nose projecting frontward therefrom. The body defines an attachment opening extending from a top surface to a bottom surface thereof. A first leg extends obliquely from one edge of the body while an opposite second leg extends obliquely from the other edge of the body and includes an alignment member. The first fastener tail is attached to the second fastener nose such that the first and second fasteners are positioned with the first and second planes being coplanar.

DESCRIPTION OF THE DRAWINGS

FIG. 1 shows a perspective view of a universal fastener according to the disclosure;

FIG. 2 shows a perspective view of another embodiment of the disclosed universal fastener;

FIG. 3 is a perspective view of a series of universal fasteners of FIG. 1;

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FIGS. 4-9 display the representative steps of a typical assembly of a decking structure using the disclosed universal fastener;

FIG. 10 is a perspective view of another embodiment of the universal fastener;

FIG. 11 is an elevation view of one side of the fastener of FIG. 13;

FIG. 12 is an elevation view the opposite side of the fastener from FIG. 11;

FIG. 13 is an elevation view of the rear side of the fastener of FIGS. 11 and 12;

FIG. 14 is an elevation view of a collated series of the embodiment of universal fastener of FIG. 10;

FIG. 15 shows a collated series of fasteners with pre-set elongated securing members engaged;

FIG. 16 is a bottom view of the collated series of fasteners shown in FIG. 14;

FIG. 17 is an enlarged view of the nose-to-tail attachment of adjacent fasteners in the collated series;

FIG. 18A shows a front elevation view of the fastener of FIG. 10; and

FIG. 18B is a bottom elevation view of the fastener shown in FIG. 18A.

DETAILED DESCRIPTION

With reference to the drawings wherein like numerals represent like parts throughout the Figures, a universal fastener for use with a variety of decking planks and a collated series of universal fasteners is disclosed.

FIG. 1 depicts a first embodiment of the disclosed universal hidden fastener 10. As shown, the fastener has a body 12 and two opposing downwardly extending legs 14, each having frontward extending side prongs 16. The body 12 defines a generally planar top surface 13a and generally planar bottom surface 13b, and an attachment opening 18 extending therethrough. As shown, the generally flat or planar portion of the body 12 transitions to lip 22 via a bend 20 toward the rear end.

This embodiment includes a tail 24 extending from the lip 22 at the rear end and a nose 25 extending from the opposite front end. The tail 24 and nose 25 will be discussed in further detail below with reference to FIGS. 3A and 3B. Embodiments of the fastener exist with only a nose or only a tail, also described further below.

Here, the attachment opening 18 is surrounded, at least partially, by a radial dome or dimple 26. In the embodiments depicted in the Figures, the opening 18 is a bore that extends substantially perpendicularly through the flat body portion of the fastener. As shown, the bore opening 18 is rearwardly offset from the central axis of the dimple 26, thereby providing an angled radial surface. In the depicted embodiment, the radial surface is angled downwardly from the front/nose end toward the rear/tail end). Alternative embodiments exist with a bore that is angled obliquely relative to the flat body portion or centered relative to the dimple. However, the depicted preferred embodiment has been shown to exhibit particularly favorable fastener attachment properties during deck assembly. The angled surface of the dimple assists in promoting an advantageous angle of drive of a securing member during installation.

The embodiment of the fastener 10 shown in FIG. 1 is substantially flat at the front end. As shown in FIG. 2, the fastener 100 may include teeth 30 extending downward as bends in the opposite front corners of the body. The remain-

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ing elements of the fastener **100** are substantially similar to the fastener **10** and thus not identified with separate reference numerals.

Typically, the smooth or flat front end of the fastener **10** is advantageous for use with natural decking planks (such as wooden) because it will not penetrate the wood surface, thereby reducing or preventing splitting of the plank material. The fastener **100** with teeth **30** is advantageous for use with composite decking planks. Penetration of the teeth **30** into composite or similar plank material significantly increases the strength and rigidity of attachment and restrains shifting effects from thermal expansion and contraction.

FIG. **3** depict a collated series **200** of universal fasteners. The fasteners that form the depicted series **200** are similar to the embodiment of FIG. **1** (no teeth projecting from the body). Clearly, fasteners with teeth may be attached at adjacent nose/tail interfaces to form a similar collated series as well. As shown, the lead fastener **201** may not include a nose extending from its front end, whereas the trailing fastener **203** may not include a tail, since neither is attached to an adjacent fastener at the respective position. Conversely, each of the intermediate fasteners, represented generally as reference numeral **205** in FIG. **3A**, includes both a nose and a tail (essentially equivalent to the embodiment of fastener from FIG. **1**). As shown, each fastener in the collated series is connected to the adjacent fastener(s) via attachment of the nose with an adjacent tail and/or vice versa. Thus it can be appreciated that a nose is unnecessary on the leading fastener **201**, as a tail is unnecessary on the trailing fastener **203**. It can also be appreciated that any of the fasteners may include both a nose and tail to accommodate preferred manufacturing and tooling techniques. FIG. **3A** depicts a series with five fasteners total (three intermediate fasteners between a lead fastener **201** and a trailing fastener **203**), but the depicted number of fasteners in a single collated series is non-limiting. FIG. **17** is an enlargement of a representative tail **24** of a fastener joined to an adjacent nose **25** of another fastener. As can be seen, the collation includes a notch **136** cut into the top and bottom portions of the metal forming the adjacent tail and nose which assists in separation of the adjacent clips during attachment of a fastener to a plank, typically by driving an elongated securing member through the attachment opening of the lead fastener (described in further below).

FIGS. **4-9** collectively depict the steps of a typical installation of a decking surface with the disclosed universal fastener.

FIG. **4** shows a section of a first grooved decking plank **40** on a support member **42**, such as a joist (also in sectional view). As represented in FIG. **5**, the front end of the fastener **100** with teeth **30** is inserted into the groove **44** and an elongate securing member (such as a screw or nail) **46** is driven through the attachment opening **18** (not seen in FIG. **5**) and into the joist **42**. The downward force of the securing member **46** drives the legs **14** to penetrate the joist surface. The downward penetration of the legs **14** is stopped by the lower surface of the fastener body **12** abutting or mating substantially flush with the lower nub of the decking plank, as shown best in FIG. **6**.

FIG. **6** shows a universal fastener **100** installed in groove of a decking plank, attaching the plank **40** to the support member **42**. The front end (here, with teeth **30** penetrating into the lower plank nub **41**) traps the lower nub **41**, thereby securing the plank to the support member. FIGS. **6** and **7** best show the rear lip **22** "open end" of the installed fastener **100** prior to receipt of a second or trailing decking plank. The

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enlarged image of FIG. **7** also clearly shows the press-fit between the fastener **100** and the securing member head.

As can be seen with reference to FIGS. **7** and **8**, the rear lip **22** provides an opening for sliding the lower nub of a trailing decking plank. FIG. **8** depicts installation of a second decking plank by sliding under the rear lip **22** of the attached fastener. The bend **20** is positioned to trap the lower nub of the trailing decking plank with the support member **42**. FIG. **9** shows the installed fastener holding the first and trailing decking planks via compressive downward force against the support member **42**, without requiring additional tightening or penetration of the decking planks.

A decking structure is assembled by attaching third, fourth, etc. planks via the same process. Notably, the configuration of the prongs **16**, which contact and/or slightly penetrate the lower nub during installation, and the legs **14** with forward extending prongs **16** assist substantially in maintaining the fastener generally level or parallel to the respective planks during attachment with the securing member. The prongs **16** may with or slightly penetrate the front surface of the lower plank nub during mate attachment, as shown most clearly in the enlarged depictions of FIGS. **7** and **9**. This is especially advantageous when employed with plank grooves that are lower (i.e., having smaller lower nubs). Attachment of the fasteners with the elongated securing members **46** can be accomplished by employing a power driving tool, much as described in co-owned U.S. application Ser. Nos. 13/030,625, 13/169,175 and 13/532,145.

The collated series of fasteners, like the series **200** depicted in FIG. **3** (collated embodiments also shown in FIGS. **14-16**), carries numerous advantages over known individual or loose fasteners. Packaging and handling a relatively rigid collated series is more facile and can be more efficient than numerous individual fasteners. The notched collation (see enlarged portion of FIG. **17**, for example) allows and/or promotes severance of the adjacent fasteners. A user can optionally remove a fastener from the series by hand prior to installation. In other embodiments, driving a securing member through the attachment opening simultaneously disengages the subject lead fastener from the adjacent fastener in the series while installing the lead fastener on the plank.

In addition, collated series of fasteners like those depicted can be used within an automatic or semi-automatic track-like feeding system, similar to a magazine in a power driving tool like a nail gun (not depicted). A track-like rail attachment may be attached and positioned appropriately on a power driving tool or even formed within the power tool itself. The track is configured to engage with the collated fastener series such that, as the lead fastener is attached to the decking plank, the remaining fasteners advance down the track automatically, for example by a rear spring or other bias. After advancement of the series, the new lead fastener (the fastener which was adjacent and joined to the installed fastener) is positioned and held in position for an elongated securing member to be driven through its respective attachment opening. The configuration of the generally flat body **12** (and **112** discussed below), legs **14** (and **114**, **115** discussed below), and outward bellow (shown as reference numerals **34** and **134**) facilitate advancement, stopping, aligning and stabilization of the disclosed fastener or collated series of fasteners at a desired installation position within a rail feeding system of an automatic or manual installation tool. One of skill in the art would readily realize that alternative advancement mechanisms may be employed, such as for example a rotating wheel.

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Notably, the variable nature of the penetration of the legs **14** into the joist, as well as the frontward extending prongs **16** allow the disclosed fastener to be used with a large variety of grooved decking planks—planks of different materials and groove styles or sizes.

FIG. **10** shows another embodiment of the disclosed universal fastener **110**. The fastener **110** includes a body **112** spacing apart two legs, **114** and **115**, which extend downwardly from shoulders **134** on opposite lateral edges of the base **112**. Like the previous embodiments, the legs each include a plurality of frontward projecting prongs **116**. As shown most clearly in FIGS. **11** and **12**, the legs **114** and **115** are angled modestly toward the front end of the fastener **110**. More specifically, the legs (**114** and **115**) have a front edge, shown generally as reference numeral **145** in FIG. **12**, angled obliquely forward so that they lie at an angle less than perpendicular to the plane defined by the flat body portion. Preferred embodiments have legs that are angled at approximately 3°-15° from a line perpendicular to the plane defined by the body **112**, and more preferably at approximately 5° relative thereto.

Like the previous embodiments, the body **112** has a generally flat portion which transitions to a lip **122** at the rear end for facilitating engagement of a trailing grooved decking plank after the fastener **110** has been used to attach a leading decking plank to a support member (i.e., joist). A typical installation may be performed substantially as shown in FIGS. **4-9** above. The lip has a tail **124** extending therefrom, similar to the tail **24** of the previous embodiments. Also like the previous embodiments, a nose **125** extends outwardly from the front end of the body **112**. The front end also includes teeth **130** formed as bends in the opposite lead corners of the body **112**. An alternate embodiment exists without the teeth, just as in the previously-disclosed embodiments.

Shown in FIGS. **11** and **13** is an outwardly projecting dimple **132** in the leg **115**. The dimple **132** is formed in one leg (but not both) to provide an element of asymmetry to the fastener **110**. The dimple **132** acts as an orientation guide, preventing backward loading of the fastener **110** (or series of fasteners, as will be discussed below) into an appropriately cooperating advancement track of a power driving tool for attachment. A cooperating track has a groove along one side configured to mate with the dimple **132** to guide installation and advancement of the fastener. Other embodiments of an asymmetric guide may be employed, such as for example a groove in one side of the fastener **110** (or one leg) which cooperates with a dimple or extension in the advancement track of the power driving tool. The described asymmetric element may be employed in any of the fastener embodiments of this disclosure.

FIG. **14** shows a collated series of fasteners **300** with the adjacent fasteners (**110**, **111**, **113**) connected via nose-to-tail attachment. FIG. **17** is an enlarged view of the connection between a fastener nose **125** and the tail **124** of the adjacent fastener, which has been discussed above.

As shown in FIG. **10**, the body **112** defines an attachment opening **118** with a reverse (downward) radial dimple **126** formed as an extrusion through the body **112**. With reference to FIG. **15**, the downward extruded configuration of the attachment opening **118** allows the fasteners **110** to be pre-set with elongate securing members (screws, nails, etc.), like those shown as reference numeral **307**. The reverse dimple **126** contour captures and reliably maintains the securing member **307**, while also improving guidance of the securing member while it is driven through the opening **118**. A collated series **300** of fasteners (**110**, **111**, **113**) with pre-set

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securing members **307** can be loaded into a loading magazine track as a single unit, thereby decreasing the number of separate parts and increasing reliability of installation. Installation can be achieved as described above with a power driving tool or simply by hand with a hammer or screwdriver. Similarly, a collated series of fasteners without pre-set securing members can be loaded into a driving tool as well. The configuration of the attachment opening **118** depicted in the Figures is non-limiting. Embodiments exist having variations of the depicted configuration, including as a half or partial extrusion through the body **112** for maintaining securing members.

Packaging and handling of the above-described pre-set fastener/securing member assemblies may cause disengagement of the securing members from the fasteners prior to use. It has been shown that an additional securement aid may be employed to provide additional adhesion between the respective securing members and fasteners. Such additional securement aids may include without limitation bushings, adhesives, grommets or eyelets.

With respect to all embodiments, the generally U or C-shaped fasteners having a substantially flat body between two opposite legs facilitates alignment and carrying of the fasteners (in a collated series or otherwise) on a rail advancement or delivery system (similar to a staple gun). The fastener legs can be bellowed slightly outward away from the central axis, as depicted by shoulders **34** and **134**. The front edge of the legs **114** and **115**, and shoulder **134** can cooperate with a positive stopper mechanism of an automatic feeding system (usually toward the front end) to aid in alignment before attachment via a driven securing member. Preferably, the positioning of the attachment opening and legs relative to the front and rear of the fastener body allows installation of the fastener with the securing member as close to tangent with the front edge of the decking plank. This position of the fastener has been shown to provide the optimal gapping between adjacent planks, as well as allows for relatively facile extraction of the fastener after the deck is complete as may be necessary for repair or disassembly.

The undercut portion, **43** and **143**, in the rear edges of the respective legs, **14**, **15**, **114** and **115** (and/or the legs of the earlier embodiments), allows installation of the trailing decking plank at the rear end of the attached fastener into a closer abutment with the already-attached plank. Spacing between adjacent planks is minimized. This configuration and arrangement allows the adjacent decking planks to overlap and substantially cover or conceal the attached fasteners (**10**, **100**, **110**, **111**, **113**, etc.) from view.

Preferably, adjacent fasteners in a collated series (see FIGS. **3**, **14-16**) are rigidly connected via their respective adjacent noses and tails. The strong, rigid engagement allows application of a stronger frontward force (by a rear spring charge or otherwise) without a substantial risk of the series of fasteners buckling or the individual fasteners inadvertently detaching. The notches **136** (see FIG. **17**) at the nose-tail interface facilitate severance of the front fastener from the adjacent fastener in the series by driving a securing member through the attachment opening. The entire series may be formed from a single sheet of rigid, strong formable material such as steel or another metal by a stamping or like process.

While a preferred embodiment has been set forth for purposes of illustration, the foregoing description should not be deemed a limitation of the invention herein. Accordingly, various modifications, adaptations and alternatives may occur to one skilled in the art without departing from the spirit of the invention and scope of the claimed coverage.

The invention claimed is:

1. A fastener for attaching a decking member to a support member, comprising a body extending from a front end to a rear end and including a generally flat portion defining a plane extending between two opposing lateral edges, the body defining an attachment opening extending from a top surface to a bottom surface thereof, a first shoulder extending from one lateral edge and transitioning to a downwardly projecting first leg and an opposite second shoulder extending from the opposing lateral edge to a downwardly projecting second leg, each leg having a front edge that is angled obliquely relative to the plane in the forward direction and having a rear edge with an undercut portion.

2. The fastener of claim 1, wherein each leg has at least one prong projecting from a front edge, each prong is defined by an upper edge extending obliquely from the leg front edge and a lower edge extending from the leg front edge substantially parallel to the plane defined by the flat portion of the body.

3. The fastener of claim 1, comprising a radial dimple surrounding the attachment opening projecting from the top surface of the body.

4. The fastener of claim 1, wherein the attachment opening is formed as an extrusion through the body from the top surface, the extrusion defining a reverse dimple surrounding the attachment opening.

5. The fastener of claim 1, comprising teeth formed as downward bends from two opposing corners of the front end of the body.

6. The fastener of claim 1, wherein each leg extends downward at a slightly oblique angle relative to the body that is not perpendicular to the plane defined by the flat portion of the body.

7. The fastener of claim 1, wherein each leg extends at an angle that is within 10 degrees from perpendicular to the plane defined by the flat portion of the body.

8. The fastener of claim 1, comprising a projection extending outward from one leg.

9. The fastener of claim 1, comprising a nose extending forward from the front end.

10. The fastener of claim 9, comprising a tail extending rearward from the rear end.

11. The fastener of claim 1, comprising a tail extending rearward from the rear end.

12. The fastener of claim 1, comprising a bend in the body rearward of the flat portion of the body.

13. The collated series of claim 12, wherein the bend transitions to an upwardly extending lip that is non-coplanar with the plane defined by the flat portion.

14. The fastener of claim 1, wherein the rear edge of each leg is angled obliquely relative to the plane in the forward direction.

15. A collated series of fasteners for attaching a decking member to a support member, comprising:

(a) a first fastener with a body extending from a front end to a rear end and including a generally flat portion extending between two opposing lateral edges, the rear end having a tail projecting rearward therefrom, the

body defining an attachment opening extending from a top surface to a bottom surface thereof, a first leg extending downward from one lateral edge of the body and an opposite second leg extending downward from the opposing lateral edge of the body, the bottom surface of the first fastener body defining a first plane, and each leg having a front edge that is angled obliquely relative to the first plane in the forward direction and having a rear edge with an undercut portion;

(b) a second fastener with a body extending from a front end to a rear end and including a generally flat portion defining a second plane extending between two opposing lateral edges, the front end having a nose projecting frontward therefrom, the body defining an attachment opening extending from a top surface to a bottom surface thereof, a first leg extending downward from one lateral edge of the body and an opposite second leg extending downward from the opposing lateral edge of the body, the bottom surface of the second fastener body defining second plane, and each leg having a front edge that is angled obliquely relative to the second plane in the forward direction and having a rear edge with an undercut portion; wherein

the first fastener tail is attached to the second fastener nose such that first and second fasteners are positioned with the first and second planes being coplanar.

16. The collated series of claim 15, wherein the attachment of the tail to the nose may be broken by force of driving of an elongated securing member with a shank and a head through the first fastener opening in an axial direction while maintaining the second fastener generally axially stationary.

17. The collated series of claim 15, comprising a nose projecting frontward from the first fastener front end.

18. The collated series of claim 15, comprising a tail projecting rearward from the second fastener rear end.

19. The collated series of claim 18, comprising a third fastener with a body extending from a front end to a rear end and including a generally flat portion extending between two opposing lateral edges, the front end having a nose projecting frontward therefrom, the body defining an attachment opening extending from a top surface to a bottom surface thereof, a first leg extending downward from one lateral edge of the body and an opposite second leg extending downward from the opposing lateral edge of the body, wherein the bottom surface of the third fastener body defines a third plane, the second fastener tail is attached to the third fastener nose such that first, second and third planes are coplanar.

20. The collated series of claim 15, wherein the rear edges of each of the legs in the first fastener is angled obliquely relative to the first plane in the forward direction.

21. The collated series of claim 15, wherein the first fastener and second fastener each includes teeth formed as downward bends from two opposing corners of the front end of the body of the respective fastener.

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